Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: NEW HA

BOSCH no. 9 460 610 295
DKKC no. 104740-0097
Date: 15.4.1988 (0)
Company: MAZDA
No: SE01 13 800E

Injection pump no. 104640-0096 (NP-VE4/10F1900RNP51)
Direction of rotation: rear end side clockwise
Prestroke setting: 0.18 - 0.22 mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1500	5.8 - 6.2 (mm)		
1-2	Feed pump pressure	1500	5.7 - 6.3 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1000	53.1 - 54.1 (cc/1000 strokes)		3.5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	300	10.8 - 14.8 (cc/1000 strokes)		2.5
1-5	Start	100	over 78.0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2100	19.1 - 25.1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery				
1-8					

2. Test values

2-1	Timing device	N = min-1	1000	1500	1900
		mm	2.4 - 3.6	5.7 - 6.3	7.6 - 8.8
2-2	Feed pump	N = min-1	500	1500	1900
		kg/cm^2	2.3 - 2.9	5.7 - 6.3	7.1 - 7.7
2-3	Overflow rate	N = min-1	1000		
		cc/10s	5.3 - 97.0		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1000	52.6 - 54.6		
	500	45.6 - 49.6		
	1500	50.3 - 54.3		
	2100	19.1 - 25.1		
	2200	below 6		
Shut-off	300	0		
Idle stop	300	10.8 - 14.8		
	below 570	0		

2-5 Magnet: Cut-in voltage max. 16 V
Test voltage 24 - 26 V

3. Dimensions

K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	1.7 - 1.9 mm
LDA	-

Angle of control lever

α	18.0 - 22.0 angle
A	5.7 - 8.3 mm
β	35.0 - 45.0 angle
B	11.2 - 14.5 mm
Y	- angle
C	- mm

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: XA

BOSCH no. 9 460 610 293
DKKC no. 104740-0153
Date: 15.4.1988 (0)
Company: MAZDA
No: 4827 13 800B

Injection pump no. 104640-0153 (NP-VE4/8F1300RNP130)

Direction of rotation: rear end side clockwise
Prestroke setting: - mm
Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1000	2,3 - 2,7 (mm)		
1-2	Feed pump pressure	1000	4,0 - 4,6 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1000	44,3 - 45,3 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	4,2 - 8,2 (cc/1000 strokes)		2,0
1-5	Start	100	over 78,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	1380	12,1 - 18,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery				
1-8					

2. Test values

2-1 Timing device	N = min-1	1000	1300	
	mm	2,2 - 2,8	3,7 - 4,9	
2-2 Feed pump	N = min-1	500	1000	1300
	kg/cm^2	2,2 - 2,8	4,0 - 4,6	5,1 - 5,7
2-3 Overflow rate	N = min-1	1000		
	cc/10s	54,0 - 98,0		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1000	43,8 - 45,8		
	500	37,5 - 41,5		
	1300	44,7 - 48,7		
	1380	12,1 - 18,1		
	1440	below 4,0		
Shut-off	350	0		
Idle stop	350	4,2 - 8,2		
	500	0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions		
K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,5 - 1,7	mm
LDA	-	
Angle of control lever		
α	9,0 - 17,0	angle
A	2,5 - 7,7	mm
β	36,0 - 46,0	angle
B	11,4 - 15,0	mm
Y	-	angle
C	-	mm

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 296
DKKC no. 104740-3612
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 103210

Injection pump no. 104640-3332 (NP-VE4/10F2100RNP433)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)		
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1250	45,3 - 46,3 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2550	15,1 - 21,1 (cc/1000 strokes)		4,0
1-7	Load-dependent start of delivery	1250	T - 0,6 ± 0,2 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2100
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8
2-2 Feed pump	N = min-1	600	1250	2100	
	kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1	
2-3 Overflow rate	N = min-1	1250			
	cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	44,8 - 46,8		
	600	42,3 - 46,3		
	2100	37,2 - 41,2		
	2550	13,1 - 23,1		
	2900	below 5,0		
Shut-off	375	0		
Idle stop	600	below 3,0		
	375	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4 mm
KF	5,7 - 5,9 mm
MS	1,1 - 1,3 mm
LDA	-

Angle of control lever

α	55,0 - 63,0 angle
A	10,5 - 16,0 mm
β	41,0 - 51,0 angle
B	12,5 - 16,5 mm
Y	- angle
C	- mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	35.7 ± 0.5 cm^3/1000 strokes	

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated.

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	34.7 - 36.7	-	(3.1)	0.2 - 1.0
1250	26.7 - 29.7	-	(2.3)	0.8 - 2.0

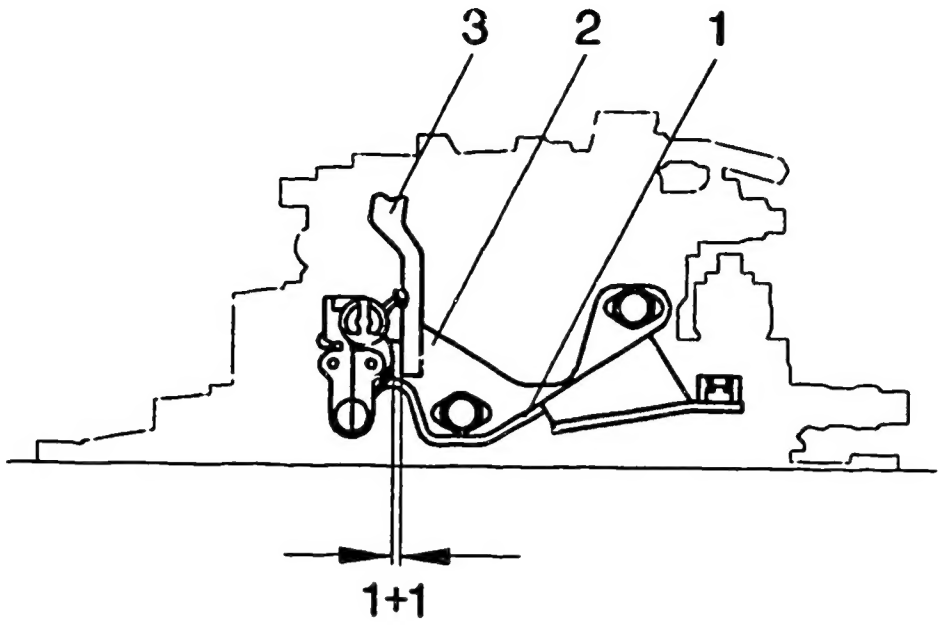


Fig. 1 104740-3612 3/3

1 = bracket
2 = M-FICD lever
3 = control lever

- SETTING THE FICD INSTALLATION POSITION

1. Maintain control lever in the idle position.

2. Set FICD bracket in such a way that the gap dimension between the control lever and the FICD lever equals 1+1 mm.

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 297
DKKC no. 104740-3632
Date: 15.4.1988 (O)
Company: MITSUBISHI
No: MD 103206

Injection pump no. 104640-3342 (NP-VE4/10F2100RNP432)
Direction of rotation: rear end side clockwise
Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)		
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1250	45,3 - 46,3 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2550	15,1 - 21,1 (cc/1000 strokes)		4,0
1-7	Load-dependent start of delivery	1250	T - 0,6 ± 0,2 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2100	
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8	
2-2 Feed pump	N = min-1	600	1250	2100		
	kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1		
2-3 Overflow rate	N = min-1	1250				
	cc/10s	48,0-92,0				

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	44,8 - 46,8		
	600	42,3 - 46,3		
	2100	37,2 - 41,2		
	2550	13,1 - 23,1		
	2900	below 5,0		
Shut-off	375	0		
Idle stop	600	below 3,0		
	375	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,1 - 1,3	mm
LDA	-	

Angle of control lever

α	55,0 - 63,0	angle
A	10,5 - 16,0	mm
β	41,0 - 51,0	angle
B	12,5 - 16,5	mm
Y	-	angle
C	-	mm

- SETTING LOAD-DEPENDENT START OF DELIVERY

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	35,7 ± 0,5 cm^3/1000 strokes	

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated.

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	34,7 - 36,7	-	(3,1)	0,2 - 1,0
1250	26,7 - 29,7	-	(2,3)	0,8 - 2,0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 298
DKKC no. 104740-3642
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 103207

Injection pump no. 104640-3352 (NP-VE4/10F2100RNP430)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm

Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values

		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)	540 - 560	
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)	540 - 560	
1-3	Full load delivery without charge-air pressure	1250	61,4 - 62,4 (cc/1000 strokes)	540 - 560	4,5
	Full load delivery with charge-air pressure	750	60,4 - 61,4 (cc/1000 strokes)	320 - 340	
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2650	22,2 - 28,2 (cc/1000 strokes)	540 - 560	5,5
1-7	Load-dependent start of delivery	1250	T-0,6 ± 0,2 (mm)	540 - 560	
1-8					

2. Test values

2-1	Timing device	N = min-1	500	750	1250	2100
		mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8
2-2	Feed pump	N = min-1	600	1250	2100	
		kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1	
2-3	Overflow rate	N = min-1	1250			
		cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	60,9 - 62,9	540 - 560	
	600	45,8 - 50,8	0	
	750	59,9 - 61,9	320 - 340	
	2100	52,8 - 57,8	540 - 560	
	2650	20,2 - 30,2	540 - 560	
	3050	below 5,0	540 - 560	
Shut-off	375	0	0	
Idle stop	600	below 3,0	0	
	375	6,0 - 10,0	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	0,9 - 1,1	mm
LDA	3,6 - 3,8	mm
Angle of control lever		
α	55,0 - 63,0	angle
A	10,5 - 16,0	mm
β	40,0 - 50,0	angle
B	12,1 - 16,1	mm
ϒ	-	angle
C	-	mm

Note:

- After setting the full-load at 1250/min, adjust the full-load from 750/min and the accelerator pressure from 0.45 kg/cm^2 to 330 mmHg, and then regulate the injection quantity with the accelerator-adjustment screw.

Note:

- Setting the timing device stroke:

  Fix LDA at 550 mmHg (0.75 kg/cm^2)

  and put control lever in the full-load delivery position, then set timing device stroke.

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	540 - 560	mmHg
Pump speed:	1250	/min
Injection quantity:	50,3 ± 0,5 cm^3/1000	strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated.

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	49,3 - 51,3	540 - 560	(3,1)	0,2 - 1,0
1250	38,7 - 41,7	540 - 560	(2,3)	0,8 - 2,0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 289
DKKC no. 104740-3652
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 103208

Injection pump no. 104640-3352 (NP-VE4/10F2100RNP430)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm

Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values

		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T = 3,5 - 3,9 (mm)	540 - 560	
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm²)	540 - 560	
1-3	Full load delivery without charge-air pressure	1250	61,4 - 62,4 (cc/1000 strokes)	540 - 560	4,5
	Full load delivery with charge-air pressure	750	60,4 - 61,4 (cc/1000 strokes)	320 - 340	
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2650	22,2 - 28,2 (cc/1000 strokes)	540 - 560	5,5
1-7	Load-dependent start of delivery	1250	T-0,6 ± 0,2 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2100
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8
2-2 Feed pump	N = min-1	600	1250	2100	
	kg/cm²	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1	
2-3 Overflow rate	N = min-1	1250			
	cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	60,9 - 62,9	540 - 560	
	600	45,8 - 50,8	0	
	750	59,9 - 61,9	320 - 340	
	2100	52,8 - 57,8	540 - 560	
	2650	20,2 - 30,2	540 - 560	
	3050	below 5,0	540 - 560	
Shut-off	375	0		
Idle stop	600	below 3,0	0	
	375	6,0 - 10,0	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	0,9 - 1,1	mm
LDA	3,6 - 3,8	mm
Angle of control lever		
α	55,0 - 63,0	angle
A	10,5 - 16,0	mm
β	40,0 - 50,0	angle
B	12,1 - 16,1	mm
γ	-	angle
C	-	mm

Note:

- After setting the full-load at 1250/min, ajust the full-load from 750/min and the accelerator pressure from 0.45 kg/cm^2 to 330 mmHg, and then regulate the injection quantity with the accelerator-adjustment screw.

Note:

- Setting the timing device stroke:

  Fix LDA at 550 mmHg (0.75 kg/cm^2)

  and put control lever in the full-load delivery position, then set timing device stroke.

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	540 - 560	mmHg
Pump speed:	1250	/min
Injection quantity:	50,3 ± 0,5 cm^3/1000 strokes	

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated.

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	49,3 - 51,3	540 - 560	(3,1)	0,2 - 1,0
1250	38,7 - 41,7	540 - 560	(2,3)	0,8 - 2,0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56T

BOSCH no. 9 460 610 299
DKKC no. 104740-3662
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 103209

Injection pump no. 104640-3362 (NP-VE4/10F2100RNP431)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T = 3,5 - 3,9 (mm)	540 - 560	
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)	540 - 560	
1-3	Full load delivery without charge-air pressure	1250	61,4 - 62,4 (cc/1000 strokes)	540 - 560	4,5
	Full load delivery with charge-air pressure	750	60,4 - 61,4 (cc/1000 strokes)	320 - 340	
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)	0	2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)	0	
1-6	Maximum speed regulation	2650	22,2 - 28,2 (cc/1000 strokes)	540 - 560	5,5
1-7	Load-dependent start of delivery	1250	T-0,6 ± 0,2 (mm)	540 - 560	
1-8					

2. Test values

2-1	Timing device	N = min-1	500	750	1250	2100
		mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8
2-2	Feed pump	N = min-1	600	1250	2100	
		kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1	
2-3	Overflow rate	N = min-1	1250			
		cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	60,9 - 62,9	540 - 560	
	600	45,8 - 50,8	0	
	750	59,9 - 61,9	320 - 340	
	2100	52,8 - 57,8	540 - 560	
	2650	20,2 - 30,2	540 - 560	
	3050	below 5,0	540 - 560	
Shut-off	375	0	0	
Idle stop	600	below 3,0	0	
	375	6,0 - 10,0	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	0,9 - 1,1	mm
LDA	3,6 - 3,8	mm

Angle of control lever

α	55,0 - 63,0	angle
A	10,5 - 16,0	mm
β	40,0 - 50,0	angle
B	12,1 - 16,1	mm
Υ	-	angle
C	-	mm

Note:

- After setting the full-load at 1250/min, ajust the full-load from 750/min and the accelerator pressure from 0.45 kg/cm^2 to 330 mmHg, and then regulate the injection quantity with the accelerator-adjustment screw.

Note:

- Setting the timing device stroke:

  Fix LDA at 550 mmHg (0.75 kg/cm^2)

  and put control lever in the full-load delivery position, then set timing device stroke.

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	540 - 560	mmHg
Pump speed:	1250	/min
Injection quantity:	50,3 ± 0,5 cm^3/1000	strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated.

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	49,3 - 51,3	540 - 560	(3,1)	0,2 - 1,0
1250	38,7 - 41,7	540 - 560	(2,3)	0,8 - 2,0

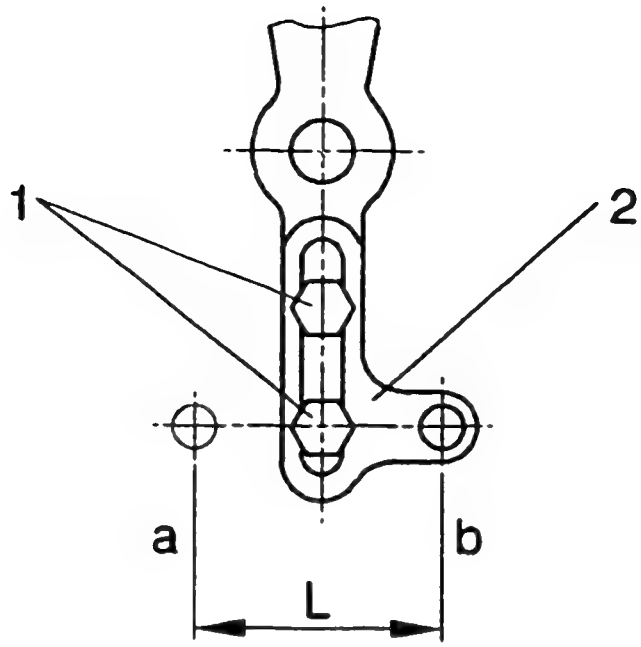


Fig. 2 104740-3662 4/4

1 = screw
2 = A/T lever
a = full-load
b = idle

- SETTING A/T CONNECTING LEVER

1. Turn control lever from the idle position to full-load position, and check that the travel (L) of the A/T lever equals

   32.9 ± 1 mm.

2. When the measurement L is not as prescribed, loosen the screw and adjust the A/T lever.

3. Following adjustment, tighten screw.

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 300
DKKC no. 104740-3672
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 106444

Injection pump no. 104640-3372 (NP-VE4/10F2100RNP460)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm

Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)		
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1250	45,3 - 46,3 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		2,0
1-6	Maximum speed regulation	2550	15,1 - 21,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	1250	T - 0,4 ± 0,8 (mm)		4,0
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2100	
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8	
2-2 Feed pump	N = min-1	600	1250	2100		
	kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1		
2-3 Overflow rate	N = min-1	1250				
	cc/10s	48,0-92,0				

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	44,8 - 46,8		
	600	42,3 - 46,3		
	2100	37,2 - 41,2		
	2550	13,1 - 23,1		
	2900	below 5,0		
Shut-off	375	0		
Idle stop	600	below 3,0		
	375	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,1 - 1,3	mm
LDA	-	

Angle of control lever

α	55,0 - 63,0	angle
A	10,5 - 16,0	mm
β	41,0 - 51,0	angle
B	12,5 - 16,5	mm
γ	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	35,7 ± 0,5 cm^3/1000 strokes	

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/3).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	34,7 - 36,7	-	(3,1)	0,2 - 1,0
1250	26,7 - 29,7	-	(2,3)	0,8 - 2,0

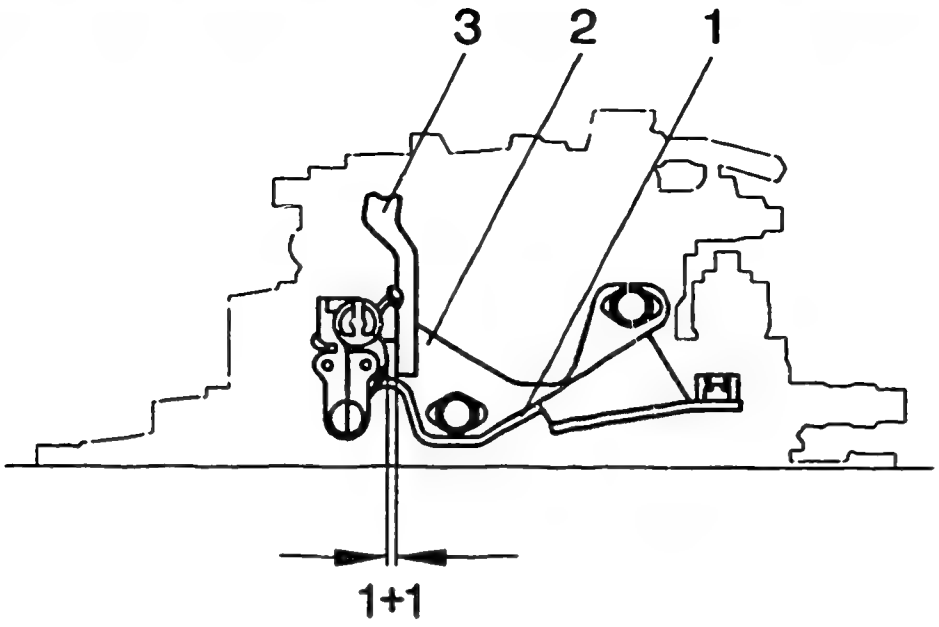


Fig. 3 104740-3672 3/3

1 = bracket
2 = M-FICD lever
3 = control lever

- SETTING THE FICD INSTALLATION POSITION

1. Maintain control lever in the idle position.

2. Set FICD bracket in such a way that the gap dimension between the control lever and the FICD lever equals 1+1 mm.

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 301
DKKC no. 104740-3682
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 106426

Injection pump no. 104640-3382 (NP-VE4/10F2100RNP461)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)		
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1250	45,3 - 46,3 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2550	15,1 - 21,1 (cc/1000 strokes)		4,0
1-7	Load-dependent start of delivery	1250	T - 0,6 ± 0,2 (mm)		
1-8					

2. Test values

2-1	Timing device	N = min-1	500	750	1250	2100
		mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8
2-2	Feed pump	N = min-1	600	1250	2100	
		kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1	
2-3	Overflow rate	N = min-1	1250			
		cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	44,8 - 46,8		
	600	42,3 - 46,3		
	2100	37,2 - 41,2		
	2550	14,6 - 21,6		
	2900	below 5,0		
Shut-off	375	0		
Idle stop	600	below 3,0		
	375	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,1 - 1,3	mm
LDA	-	

Angle of control lever

α	19,0 - 27,0	angle
A	12,4 - 17,8	mm
β	41,0 - 51,0	angle
B	12,1 - 16,1	mm
γ	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	35,7 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/2).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	34,7 - 36,7	-	(3,1)	0,2 - 1,0
1250	26,7 - 29,7	-	(2,3)	0,8 - 2,0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 318
DKKC no. 104740-3692
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 109319

Injection pump no. 104640-3382 (NP-VE4/10F2100RNP461)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)		
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1250	45,3 - 46,3 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2550	15,1 - 21,1 (cc/1000 strokes)		4,0
1-7	Load-dependent start of delivery	1250	T - 0,6 ± 0,2 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2100	
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8	
2-2 Feed pump	N = min-1	600	1250	2100		
	kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1		
2-3 Overflow rate	N = min-1	1250				
	cc/10s	48,0-92,0				

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	44,8 - 46,8		
	600	42,3 - 46,3		
	2100	37,2 - 41,2		
	2550	14,6 - 21,6		
	2900	below 5,0		
Shut-off	375	0		
Idle stop	600	below 3,0		
	375	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,1 - 1,3	mm
LDA	-	

Angle of control lever

α	19,0 - 27,0	angle
A	12,4 - 17,8	mm
β	41,0 - 51,0	angle
B	12,1 - 16,1	mm
Y	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	35,7 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/2).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	34,7 - 36,7	-	(3,1)	0,2 - 1,0
1250	26,7 - 29,7	-	(2,3)	0,8 - 2,0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 291
DKKC no. 104740-3712
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 106446

Injection pump no. 104640-3392 (NP-VE4/10F2100RNP462)
Direction of rotation: rear end side clockwise
Prestroke setting: - mm
Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)	540 - 560	
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm²)	540 - 560	
1-3	Full load delivery with charge-air air pressure	1250	61,4 - 62,4 (cc/1000 strokes)	540 - 560	4,5
	Full load delivery with charge-air pressure	750	60,4 - 61,4 (cc/1000 strokes)	320 - 340	
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)	0	2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)	0	
1-6	Maximum speed regulation	2650	22,2 - 28,2 (cc/1000 strokes)	540 - 560	5,5
1-7	Load-dependent start of delivery	1250	T-0,6 ± 0,2 (mm)	540 - 560	
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2100
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8
2-2 Feed pump	N = min-1	600	1250	2100	
	kg/cm²	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1	
2-3 Overflow rate	N = min-1	1250			
	cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	60,9 - 62,9	540 - 560	
	600	45,8 - 50,8	0	
	750	59,9 - 61,9	320 - 340	
	2100	52,8 - 57,8	540 - 560	
	2650	20,2 - 30,2	540 - 560	
	3050	below 5,0	540 - 560	
Shut-off	375	0	0	
Idle stop	600	below 3,0	0	
	375	6,0 - 10,0	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	0,9 - 1,1	mm
LDA	3,6 - 3,8	mm
Angle of control lever		
α	19,0 - 27,0	angle
A	10,5 - 16,0	mm
β	40,0 - 50,0	angle
B	12,1 - 16,1	mm
γ	-	angle
C	-	mm

Note:

- After setting the full-load at 1250/min, adjust the full-load from 750/min and the accelerator pressure from 0,45 kg/cm² to 330 mmHg, and then regulate the injection quantity with the accelerator-adjustment screw.

Note:

- Setting the timing device stroke:
  Fix LDA at 550 mmHg (0,75 kg/cm²)
  and put control lever in the full-load delivery position, then set timing device stroke.

- SETTING LOAD-DEPENDENT START OF DELIVERY

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	540 - 560	mmHg
Pump speed:	1250	/min
Injection quantity:	50,3 ± 0,5	cm³/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated (page 1/2).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm³/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	49,3 - 51,3	540 - 560	(3,1)	0,2 - 1,0
1250	38,7 - 41,7	540 - 560	(2,3)	0,8 - 2,0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56T

BOSCH no. 9 460 610 302
DKKC no. 104740-3722
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 106429

Injection pump no. 104640-3402 (NP-VE4/10F2100RNP463)

Direction of rotation: rear end side clockwise
Prestroke setting: - mm
Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values

		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)	540 - 560	
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)	540 - 560	
1-3	Full load delivery with charge-air air pressure	1250	61,4 - 62,4 (cc/1000 strokes)	540 - 560	4,5
	Full load delivery with charge-air pressure	750	60,4 - 61,4 (cc/1000 strokes)	320 - 340	
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)	0	2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)	0	
1-6	Maximum speed regulation	2650	22,2 - 28,2 (cc/1000 strokes)	540 - 560	5,5
1-7	Load-dependent start of delivery	1250	T-0,6 ± 0,2 (mm)	540 - 560	
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2100
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,6 - 7,8
2-2 Feed pump	N = min-1	600	1250	2100	
	kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,5 - 7,1	
2-3 Overflow rate	N = min-1	1250			
	cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	60,9 - 62,9	540 - 560	
	600	45,8 - 50,8	0	
	750	59,9 - 61,9	320 - 340	
	2100	52,8 - 57,8	540 - 560	
	2650	20,2 - 30,2	540 - 560	
	3050	below 5,0	540 - 560	
Shut-off	375	0	0	
Idle stop	600	below 3,0	0	
	375	6,0 - 10,0	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	0,9 - 1,1	mm
LDA	3,6 - 3,8	mm
Angle of control lever		
α	19,0 - 27,0	angle
A	10,5 - 16,0	mm
β	40,0 - 50,0	angle
B	12,1 - 16,1	mm
Y	-	angle
C	-	mm

Note:

- After setting the full-load at 1250/min, adjust the full-load from 750/min and the accelerator pressure from

  0,45 kg/cm² to 330 mmHg,

  and then regulate the injection quantity with the accelerator-adjustment screw.

Note:

- Setting the timing device stroke:

  Fix LDA at 550 mmHg (0,75 kg/cm²)

  and put control lever in the full-load delivery position, then set timing device stroke.

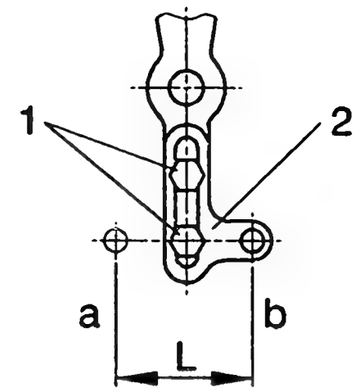


Fig. 4

1 = screw
2 = A/T lever
a = full-load
b = idle

- SETTING A/T CONNECTING LEVER

1. Turn control lever from the idle position to full-load position, and check that the travel (L) of the A/T lever equals

   32,9 ± 1 mm.

2. When the measurement L is not as prescribed, loosen the screw and adjust the A/T lever.

3. Following adjustment, tighten screw.

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	540 - 560	mmHg
Pump speed:	1250	/min
Injection quantity:	50,3 ± 0,5 cm^3/1000	strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated.

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	49,3 - 51,3	540 - 560	(3,1)	0,2 - 1,0
1250	38,7 - 41,7	540 - 560	(2,3)	0,8 - 2,0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4D56

BOSCH no. 9 460 610 303
DKKC no. 104740-3762
Date: 15.4.1988 (0)
Company: MITSUBISHI
No: MD 120184

Injection pump no. 104640-3432 (NP-VE4/10F2000RNP515)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	T=3,5 - 3,9 (mm)		
1-2	Feed pump pressure	1250	4,5 - 5,1 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1250	45,3 - 46,3 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	375	6,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	63,0 - 83,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2150	15,1 - 21,1 (cc/1000 strokes)		4,0
1-7	Load-dependent start of delivery	1250	T=0,4 - 0,8 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	500	750	1250	2000
	mm	0,6 - 1,8	1,4 - 2,6	3,3 - 4,1	6,2 - 7,4
2-2 Feed pump	N = min-1	600	1250	2000	
	kg/cm^2	2,9 - 3,5	4,5 - 5,1	6,3 - 6,9	
2-3 Overflow rate	N = min-1	1250			
	cc/10s	48,0-92,0			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	44,8 - 46,8		
	600	42,3 - 46,3		
	2000	37,2 - 41,2		
	2150	13,1 - 23,1		
	2500	below 5,0		
Shut-off	375	0		
Idle stop	375	6,0 - 10,0		
	600	below 3,0		

2-5 Magnet: Cut-in voltage max. 8 V; Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,1 - 1,3	mm
LDA	-	

Angle of control lever

α	55,0 - 63,0	angle
A	10,5 - 16,0	mm
β	39,0 - 49,0	angle
B	11,7 - 15,7	mm
Y	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	35, 2 - 36, 2 cm^3/1000 strokes	

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/2).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	34.7 - 36.7	-	(3.1)	0.2 - 1.0
1250	26.7 - 29.7	-	(2.3)	0.8 - 2.0

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: TD25

BOSCH no. 9 460 610 314
DKKC no. 104740-9633
Date: 15.4.1988 (0)
Company: NISSAN DIESEL
No: 16700 44G04

Injection pump no. 104640-9633 (NP-VE4/10F2150RNP567)
Direction of rotation: rear end side clockwise
Prestroke setting: Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1700	on 6,1 - 6,9 (mm)		
1-2	Feed pump pressure	1700	off 4,7 - 5,1 on 5,9 - 6,7 (kg/cm²) off 4,9 - 5,5		
1-3	Full load delivery without charge-air pressure	1100	48,0 - 49,0 (cc/1000 strokes)		3,0
1-4	Low-idle speed regulation	350	4,5 - 8,5 (cc/1000 strokes)		2,0
1-5	Start	100	45,0 - 80,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2500	10,1 - 14,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery				
1-8					

2. Test values

2-1 Timing device	Pulling electro-magnet N = min⁻¹ mm	ON	1700 6,0-7,0	1700 4,6-5,2	OFF	2300 6,0-7,0	
2-2 Feed pump	N = min-1 kg/cm²	1000 4,5-5,3	1700 5,9-6,7	1000 3,5-4,1	1700 4,9-5,5	2150 5,8-6,4	
2-3 Overflow rate	N = min-1 cc/10s	1100 43,0-87,0	1100 60-130	(without O-ring)			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1100	47,5 - 49,5		
	600	45,1 - 49,1		
	2150	38,5 - 42,8		
	2300	28,3 - 37,3		
	2500	9,6 - 14,6		
	2700	below 5,0		
Shut-off	350	0		
Idle stop	350	4,5 - 8,5		
	450	below 3,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	0,9 - 1,1	mm
LDA	-	mm
Angle of control lever		
α	35,5 - 43,5	angle
YA	24,3 - 28,7	mm
β	31,0 - 41,0	angle
B	9,3 - 12,9	mm
Y	-	angle
C	-	mm

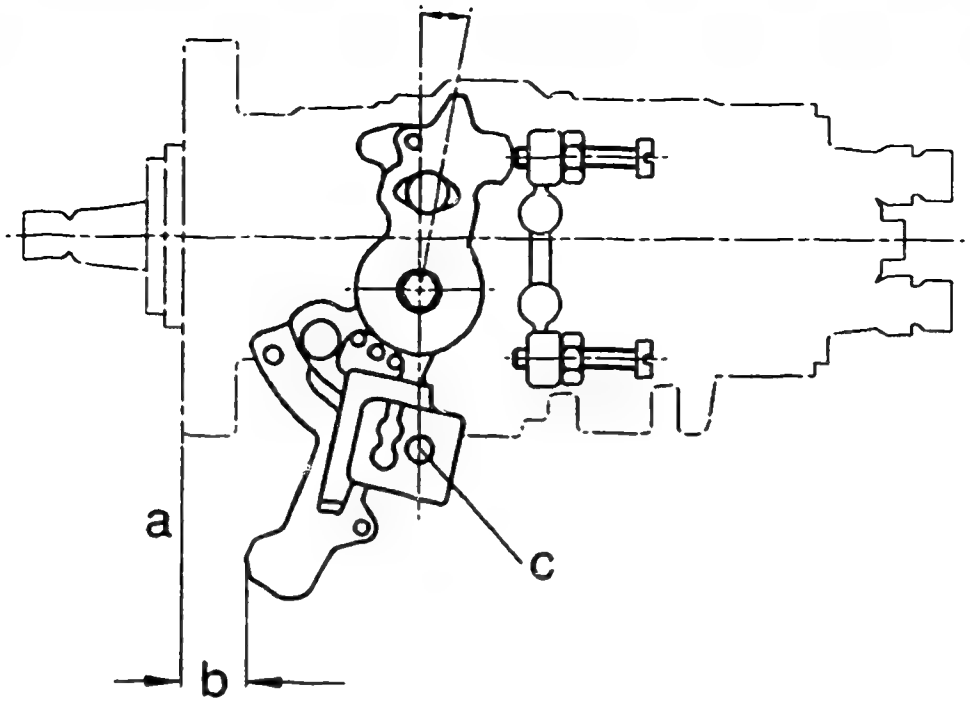


Fig. 5 104740-9633 2/2

a = flange facing
b = measurement "YA"
c = bore A

- POSITION FOR MEASURING CONTROL LEVER ANGLE
  (1) Measure control lever angle (α, β, Y) at bore A.

Note:

- The pulling electromagnet is not defined as ON or OFF.
  All specifications here correspond to OFF.

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4JB1-A

BOSCH no. 9 460 610 319
DKKC no. 104741-1272
Date: 15.4.1988 (0)
Company: ISUZU
No: 894426 8511

Injection pump no. 104641-1172 (NP-VE4/11F1800RNP419)

Direction of rotation: rear end side clockwise

Prestroke setting: 0,43 - 0,47 mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1550	1,7 - 2,1 (mm)		
1-2	Feed pump pressure	1550	5,1 - 5,5 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1000	44,1 - 45,1 (cc/1000 strokes)		3,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	390	7,0 - 11,0 (cc/1000 strokes)		2,0
1-5	Start	100	75,0 - 115,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2100	9,8 - 15,8 (cc/1000 strokes)		3,5
1-7	Load-dependent start of delivery				
1-8					

2. Test values

2-1 Timing device	Pulling electro-magnet N = min^{-1} mm	690 - 890 (on) 0,5	1400-1500 0,5	1550 (off) 1,6 - 2,2	1900 5,3 - 6,2	
2-2 Feed pump	N = min-1 kg/cm^2	1000 3,1 - 3,7	1550 5,1 - 5,5	1850 6,0 - 6,6		
2-3 Overflow rate	N = min-1 cc/10s	1550 67,0-111,0				

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1000	43,6 - 45,6		
	500	41,8 - 48,8		
	700	34,3 - 38,3		
	1350	45,0 - 49,0		
	1700	44,4 - 49,4		
	1900	32,5 - 39,5		
	2100	9,3 - 16,3		
	2300	below 7,0		
Shut-off	390	0		
Idle stop	390	7,0 - 11,0		
	550	below 3,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	2,7 - 2,9	mm
KF	4,9 - 5,1	mm
MS	0,9 - 1,1	mm
LDA	-	mm
Angle of control lever		
α	14,0 - 22,0	angle
A	2,5 - 7,6	mm
β	30,0 - 40,0	angle
B	8,7 - 12,6	mm
Y	-	angle
C	-	mm

Note:
The pulling electromagnet is not defined as ON or OFF. All specifications here correspond to OFF.

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4JB1CDT

BOSCH no. 9 460 610 315
DKKC no. 104741-1742
Date: 15.4.1988 (0)
Company: ISUZU
No: 894475 1614

Injection pump no. 104641-1742 (NP-VE4/11F1900RNP578)
Direction of rotation: rear end side clockwise
Prestroke setting: - mm
Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1700	5,0 - 5,4 (mm)	590 - 610	
1-2	Feed pump pressure	1700	5,2 - 5,6 (kg/cm²)	590 - 610	
1-3	Full load delivery without charge-air pressure	1250	63,2 - 64,2 (cc/1000 strokes)	590 - 610	3,5
	Full load delivery with charge-air pressure	900	50,9 - 51,9 (cc/1000 strokes)	340 - 360	4,5
1-4	Low-idle speed regulation	385	3,1 - 7,1 (cc/1000 strokes)	0	2,0
1-5	Start	100	60,0 -100,0 (cc/1000 strokes)	0	
1-6	Maximum speed regulation	2300	19,3 - 25,4 (cc/1000 strokes)	590 - 610	4,5
1-7	Load-dependent start of delivery				
1-8					

2. Test values

2-1 Timing device	Pulling electro-magnet N = min⁻¹ mm	ON 500 over 0,5	OFF 1450 2,1-2,9	1700 4,9-5,5	1850 5,8-6,5	
2-2 Feed pump	N = min-1	500	500	1450	1700	1850
	kg/cm²	4,0-6,0	over 0,8	4,3-4,9	5,2-5,6	5,6-6,2
2-3 Overflow rate	N = min-1		1700			
	cc/10s		73 - 150			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	62,7 - 64,7	590 - 610	
	600	33,1 - 41,1	90 - 110	
	750	38,7 - 42,7	170 - 180	
	900	50,4 - 52,4	340 - 360	
	1800	54,6 - 61,6	590 - 610	
	2300	18,8 - 25,8	590 - 610	
	2500	below 5,0	590 - 610	
Shut-off	385	0	0	
Idle stop	385	3,1 - 7,1	0	
		below 3,0	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	2,7 - 2,9	mm
KF	5,7 - 5,9	mm
MS	0,8 - 1,0	mm
LDA	4,4 - 4,6	mm
Angle of control lever		
α	14,0 - 22,0	angle
A	11,3 - 14,7	mm
β	32,0 - 42,0	angle
B	10,1 - 13,6	mm
γ	-	angle
C	-	mm

Note:

- After setting the full-load at 1250/min, adjust the full-load from 900/min and the accelerator pressure from 340 - 360 mmHg, and then set the injection quantity with the accelerator compensator-adjustment screw.

- The pulling electromagnet is not defined as ON or OFF.
  All specifications here correspond to OFF.

- When checking the timing device travel and feed pump pressure, apply charge-air pressure of 590 - 610 mmHg to the charge-air pressure chamber.

- SETTING MICROSWITCH
  1. Position control lever so that the distance between the lever and the idle stop screw equals
     6.0 ± 0.4 mm

     (control lever angle: 13° - 15°) and lock lever into place.

  2. Choose the mounting position of the microswitch so that it is switched to OFF.

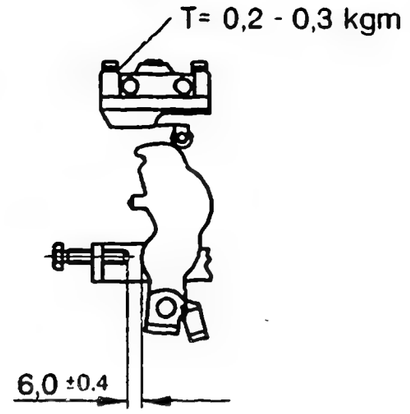


Fig. 6

- SETTING THE V-FICD (set when W-KSB is loosened)

  1) Setting installation position of V-FICD.

     1. Lock control lever in the idle position.
     2. Set V-FICD bracket in such a way that the gap dimension "S" between the box rod and the pin pressed into the control lever equals 1±1 mm.

  2) Setting V-FICD travel

     1. Keep control lever in idle position.
     2. Apply vacuum of 400 mmHg to interior of vacuum control unit.
     3. Check whether the V-FICD consumer-shaft makes the whole stroke.

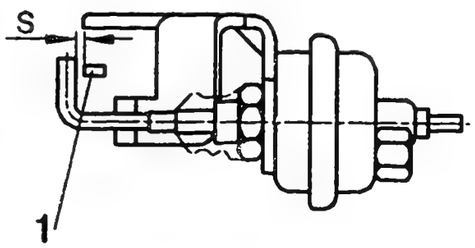


Fig. 7

1 = control lever

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: 4JB1CDT

BOSCH no. 9 460 610 316
DKKC no. 104741-1752
Date: 15.4.1988 (0)
Company: ISUZU
No: 894475 1624

Injection pump no. 104641-1742 (NP-VE4/11F1900RNP578)
Direction of rotation: rear end side clockwise
Prestroke setting: - mm
Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values

		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1700	5,0 - 5,4 (mm)	590 - 610	
1-2	Feed pump pressure	1700	5,2 - 5,6 (kg/cm²)	590 - 610	
1-3	Full load delivery without charge-air pressure	1250	63,2 - 64,2 (cc/1000 strokes)	590 - 610	3,5
	Full load delivery with charge-air pressure	900	50,9 - 51,9 (cc/1000 strokes)	340 - 360	4,5
1-4	Low-idle speed regulation	385	3,1 - 7,1 (cc/1000 strokes)	0	2,0
1-5	Start	100	60,0 -100,0 (cc/1000 strokes)	0	
1-6	Maximum speed regulation	2300	19,3 - 25,4 (cc/1000 strokes)	590 - 610	4,5
1-7	Load-dependent start of delivery				
1-8					

2. Test values

2-1	Timing device	Pulling electro-magnet N = min⁻¹ mm	ON 500 over 0,5	OFF 1450 2,1-2,9	1700 4,9-5,5	1850 5,8-6,5
2-2	Feed pump	N = min-1	500	500	1450	1700	1850
		kg/cm²	4,0-6,0	over 0,8	4,3-4,9	5,2-5,6	5,6-6,2
2-3	Overflow rate	N = min-1		1700			
		cc/10s		73 - 150			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1250	62,7 - 64,7	590 - 610	
	600	33,1 - 41,1	90 - 110	
	750	38,7 - 42,7	170 - 180	
	900	50,4 - 52,4	340 - 360	
	1800	54,6 - 61,6	590 - 610	
	2300	18,8 - 25,8	590 - 610	
	2500	below 5,0	590 - 610	
Shut-off	385	0	0	
Idle stop	385	3,1 - 7,1	0	
		below 3,0	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	2,7 - 2,9	mm
KF	5,7 - 5,9	mm
MS	0,8 - 1,0	mm
LDA	4,4 - 4,6	mm
Angle of control lever		
α	14,0 - 22,0	angle
A	11,3 - 14,7	mm
β	32,0 - 42,0	angle
B	10,1 - 13,6	mm
Y	-	angle
C	-	mm

Note:

- After setting the full-load at 1250/min, adjust the full-load from 900/min and the accelerator pressure from 340 - 360 mmHg, and then set the injection quantity with the accelerator compensator-adjustment screw.

- The pulling electromagnet is not defined as ON or OFF.
  All specifications here correspond to OFF.

- When checking the timing device travel and feed pump pressure, apply charge-air pressure of 590 - 610 mmHg to the charge-air pressure chamber.

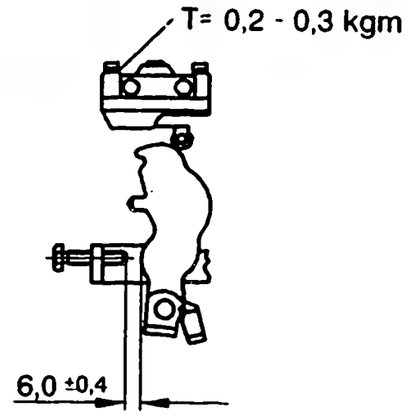


Fig. 8

- SETTING MICROSWITCH
  1. Position control lever so that the distance between the lever and the idle stop screw equals
     6.0 ± 0.4 mm

     (control lever angle: 13° - 15°) and lock lever into place.

  2. Choose the mounting position of the microswitch so that it is switched to OFF.

Fig. 9

1 = control lever

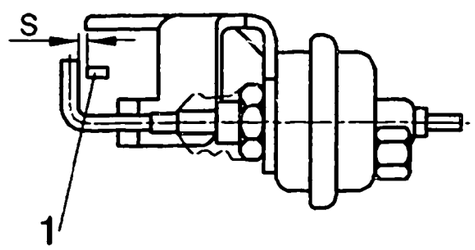
- SETTING THE V-FICD (set when W-KSB is loosened)

  1) Setting installation position of V-FICD.

     1. Lock control lever in the idle position.
     2. Set V-FICD bracket in such a way that the gap dimension "S" between the box rod and the pin pressed into the control lever equals 1+1 mm.

  2) Setting V-FICD travel

     1. Keep control lever in idle position.
     2. Apply vacuum of 400 mmHg to interior of vacuum control unit.
     3. Check whether the V-FICD consumer-shaft makes the whole stroke.



Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: RF

BOSCH no. 9 460 610 304
DKKC no. 104748-0135
Date: 15.4.1988 (0)
Company: MAZDA
No: RF01 13 800E

Injection pump no. 104648-0135 (NP-VE4/8F2325RNP205)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1375	4,5 - 4,9 (mm)		
1-2	Feed pump pressure	1375	4,4 - 5,0 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1375	35,6 - 36,6 (cc/1000 strokes)		2,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	6,0 - 10,0 (cc/1000 strokes)		2,0
1-5	Start	100	over 42,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2500	19,1 - 23,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	1375	3,9 - 4,3 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	1375	1750	2325
	mm	4,4 - 5,0	6,1 - 7,3	7,2 - 8,4
2-2 Feed pump	N = min-1	500	1375	2325
	kg/cm^2	1,9 - 2,5	4,4 - 5,0	7,0 - 7,6
2-3 Overflow rate	N = min-1	1375		
	cc/10s	46,3 - 90,3		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1375	35,1 - 37,1		
	500	28,0 - 32,0		
	2325	30,2 - 34,2		
	2500	18,1 - 24,1		
	2750	below 4,0		
Shut-off	350	0		
Idle stop	350	6,0 - 10,0		
	450	below 4,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,4 - 1,6	mm
LDA	-	

Angle of control lever

α	26,0 - 34,0	angle
A	4,0 - 9,5	mm
β	40,0 - 50,0	angle
B	12,5 - 15,8	mm
Υ	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1375	/min
Injection quantity:	28,2 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1 /4).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1375	28,2 ± 1,5	-	4,1 ± 0,3	-
1375	16,1 ± 1,5	-	2,9 ± 0,7	-

• MOUNTING AND SETTING M-KSB

1) Setting the M-KSB stop

1. Fix M-KSB unit temporarily to pump casing.
2. Crank drive shaft at least twice in the direction of rotation of the pump.
3. Crank drive shaft slowly, and lock into position at the point where resistance is felt (roller in the bracket is now laying against the disc cam).
4. Rotate KSB lever in direction of adjustment.
5. Hold KSB lever at the position in which the knuckle bolts are just touching the head of the shaft of the roller bracket (roller bracket - advance angle "0").
6. Set stop in such a way that the gap dimension between the KSB lever and the stop equals
   0.5 + 2 mm.
7. After setting, tighten the fixing screw with the torque prescribed for M-KSB
   T = 0.6 - 0.9 kpm.

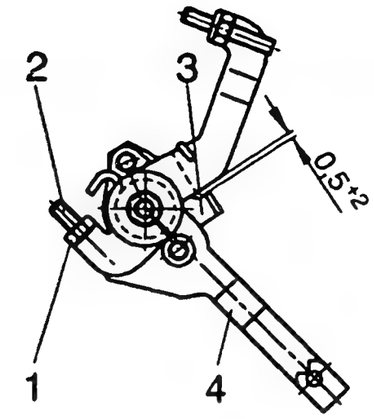


Fig. 10
1 = nut
2 = adjustment screw
3 = stop
4 = KSB lever

2) Setting the FICD screw

1. Turn KSB lever the other way until it touches the stop.
2. Insert guage block (feeler gauge)
   4.8 ±0.1 mm
   between control lever and idle stop screw (distance from idle position 7°).
3. Set FICD screw in such a way that the control lever and the FICD screw are touching.

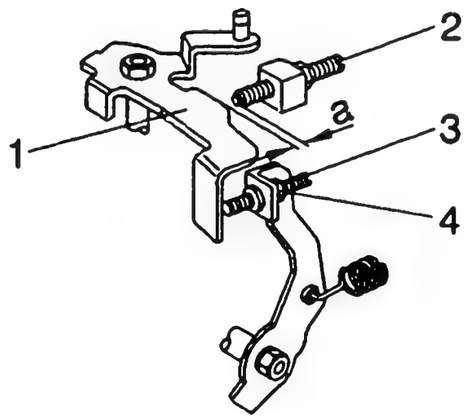


Fig. 11
1 = control lever
2 = idle stop screw
3 = FICD screw
4 = nut
a = gauge block

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: RF

BOSCH no. 9 460 610 305
DKKC no. 104748-0145
Date: 15.4.1988 (0)
Company: MAZDA
No: RF02 13 800E

Injection pump no. 104648-0145 (NP-VE4/8F2325RNP206)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1375	4,5 - 4,9 (mm)		
1-2	Feed pump pressure	1375	4,4 - 5,0 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1375	35,6 - 36,6 (cc/1000 strokes)		2,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	6,0 - 10,0 (cc/1000 strokes)		2,0
1-5	Start	100	over 42,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2500	19,1 - 23,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	1375	3,9 - 4,3 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	1375	1750	2325
	mm	4,4 - 5,0	6,1 - 7,3	7,2 - 8,4
2-2 Feed pump	N = min-1	500	1375	2325
	kg/cm^2	1,9 - 2,5	4,4 - 5,0	7,0 - 7,6
2-3 Overflow rate	N = min-1	1375		
	cc/10s	46,3 - 90,3		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1375	35,1 - 37,1		
	500	28,0 - 32,0		
	2325	30,2 - 34,2		
	2500	18,1 - 24,1		
	2750	below 4,0		
Shut-off	350	0		
Idle stop	350	6,0 - 10,0		
	450	below 4,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,4 - 1,6	mm
LDA	-	

Angle of control lever

α	26,0 - 34,0	angle
A	4,0 - 9,5	mm
β	40,0 - 50,0	angle
B	12,5 - 15,8	mm
Y	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1375	/min
Injection quantity:	28,2 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/5)

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1375	28,2 ± 1,5	-	4,1 ± 0,3	-
1375	16,1 ± 1,5	-	2,9 ± 0,7	-

- MOUNTING AND SETTING M-KSB

1) Setting the M-KSB stop

1. Fix M-KSB unit temporarily to pump casing.

2. Crank drive shaft at least twice in the direction of rotation of the pump.

3. Crank drive shaft slowly, and lock into position at the point where resistance is felt (roller in the bracket is now laying against the disc cam).

4. Rotate KSB lever in direction of adjustment.

5. Hold KSB lever at the position in which the knuckle bolts are just touching the head of the shaft of the roller bracket
(roller bracket - advance angle "0").

6. Set stop in such a way that the gap dimension between the KSB lever and the stop equals
0.5 + 2 mm.

7. After setting, tighten the fixing screw with the torque prescribed for M-KSB
T = 0.6 - 0.9 kpm.

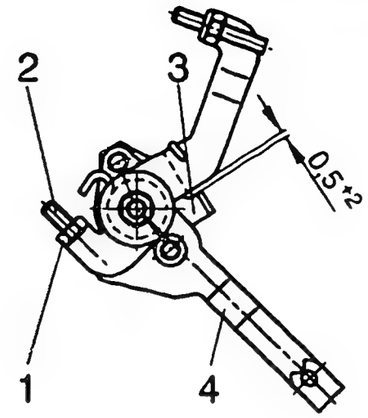


Fig. 12

1 = nut
2 = adjustment screw
3 = stop
4 = KSB lever

1. Turn KSB lever the other way until it touches the stop.

2. Insert gauge block (feeler gauge)

   4.8 ± 0,1 mm

   between control lever and idle stop screw (distance from idle position 7°).

3. Set FICD screw so that the control lever and the FICD screw are touching.

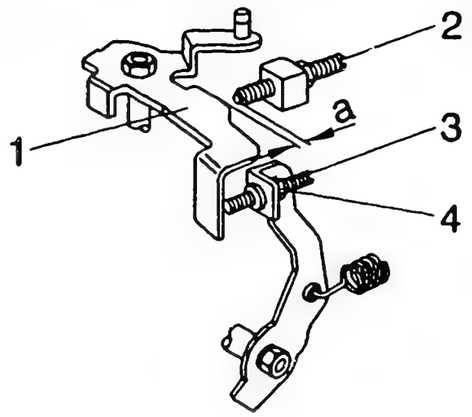


Fig. 13
1 = control lever
2 = idle stop screw
3 = FICD screw
4 = nut
a = gauge block

- SETTING MICROSWITCH

1. Position control lever so that the distance between the lever and the idle stop screw equals

   8.5 ± 1 mm

   (control lever angle: 12.5°) and lock lever into place.

2. Set adjustment screw so that the microswitch is switched to ON.

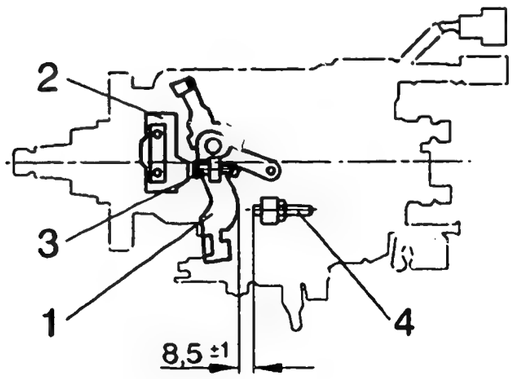


Fig. 14
1 = control lever
2 = microswitch
3 = adjustment screw
4 = idle stop screw

1) Set installation location of V-FICD

1. Stop control lever in the idle position.

2. Set vacuum unit support so that the gap dimension between control lever roller and support bracket equals

$$2 \pm {}^{2}_{1} \text{ mm.}$$

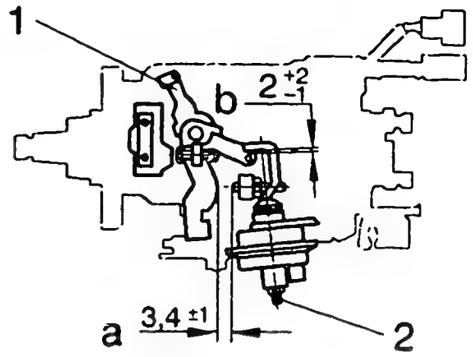


Fig. 15
1 = control lever
2 = adjustment screw
a = from idle position
b = gap dimension inside

2) Set V-FICD travel

1. Move V-FICD across entire operating travel distance.

2. Set the gap dimension between the control lever and the idle stop screw on the adjustment screw at

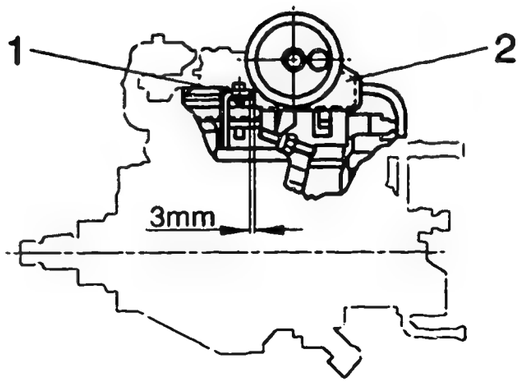
$$3.4 \pm 1 \text{ mm.}$$

(Control lever angle: 5°)

- SETTING INSTALLATION LOCATION OF FICD

Set bracket in such a way that gap dimension between the control lever and the FICD bracket equals more than 3 mm.

Fig. 16
1 = control lever
2 = FICD bracket



Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: R2

BOSCH no. 9 460 610 306
DKKC no. 104748-0154
Date: 15.4.1988 (0)
Company: MAZDA
No: R201 13 800D

Injection pump no. 104648-0154 (NP-VE4/8F2125RNP207)
Direction of rotation: rear end side clockwise
Prestroke setting: - mm
Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values

		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	3,3 - 3,7 (mm)		
1-2	Feed pump pressure	1250	4,9 - 5,5 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1500	38,2 - 39,2 (cc/1000 strokes)		2,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	6,0 - 10,0 (cc/1000 strokes)		2,0
1-5	Start	100	over 42,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2400	11,1 - 15,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	1250	2,7 ± 0,2 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	1250	1500	2125
	mm	3,2 - 3,8	4,1 - 5,3	7,0 - 8,2
2-2 Feed pump	N = min-1	500	1250	2125
	kg/cm^2	2,7 - 3,3	4,9 - 5,5	7,3 - 7,9
2-3 Overflow rate	N = min-1	1250		
	cc/10s	49,7 - 93,7		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1500	37,7 - 39,7		
	500	30,7 - 34,7		
	2125	32,0 - 36,0		
	2400	10,1 - 16,1		
	2550	below 4,0		
Shut-off	350	0		
Idle stop	350	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,4 - 1,6	mm
LDA	-	mm
Angle of control lever		
α	28,0 - 32,0	angle
A	5,4 - 8,2	mm
β	40,0 - 50,0	angle
B	12,5 - 15,8	mm
Y	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	28,2 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/4).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	28,2 ± 1,5	-	2,7 ± 0,3	-
1250	18,1 ± 1,5	-	1,5 ± 0,7	-

● MOUNTING AND SETTING M-KSB

1) Setting the M-KSB stop

1. Fix M-KSB unit temporarily to pump casing.

2. Crank drive shaft at least twice in the direction of rotation of the pump.

3. Crank drive shaft slowly, and lock into position at the point where resistance is felt (roller in the bracket is now laying against the disc cam).

4. Rotate KSB lever in direction of adjustment.

5. Hold KSB lever at the position in which the knuckle bolts are just touching the head of the shaft of the roller bracket
(roller bracket - advance angle "0").

6. Set stop in such a way that the gap dimension between the KSB lever and the stop equals
0.5 + 2 mm.

7. After setting, tighten the fixing screw with the torque prescribed for M-KSB
T = 0.6 - 0.9 kpm.

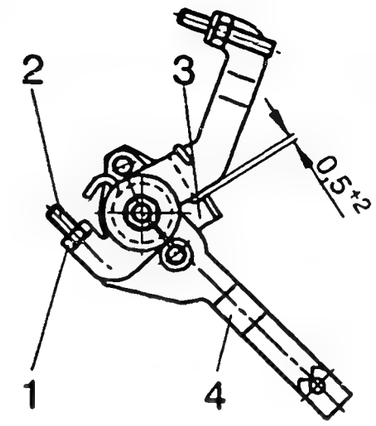


Fig. 17
1 = nut
2 = adjustment screw
3 = stop
4 = KSB lever

2) Setting the FICD screw
1. Turn KSB lever the other way until it touches the stop.
2. Insert guage block (feeler gauge)
4.8 ± 1 mm
between control lever and idle stop screw (distance from idle position 7°).
3. Set FICD screw in such a way that the control lever and the FICD screw are touching.

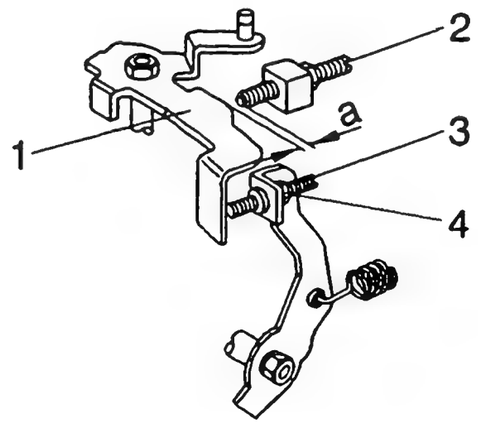


Fig. 18
1 = control lever
2 = idle stop screw
3 = FICD screw
4 = nut
a = gauge block

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: R2

BOSCH no. 9 460 610 307
DKKC no. 104748-0164
Date: 15.4.1988 (0)
Company: MAZDA
No: R202 13 800D

Injection pump no. 104648-0164 (NP-VE4/8F2125RNP208)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	3,3 - 3,7 (mm)		
1-2	Feed pump pressure	1250	4,9 - 5,5 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1500	38,2 - 39,2 (cc/1000 strokes)		2,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	6,0 - 10,0 (cc/1000 strokes)		2,0
1-5	Start	100	over 42,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2400	11,1 - 15,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	1250	2,7 ± 0,2 (mm)		
1-8					

2. Test values

2-1	Timing device	N = min-1	1250	1500	2125
		mm	3,2-3,8	4,1-5,3	7,0-8,2
2-2	Feed pump	N = min-1	500	1250	1500	2125
		kg/cm^2	2,7-3,3	4,9-5,5	5,6-6,2	7,3-7,9
2-3	Overflow rate	N = min-1	1250			
		cc/10s	49,7 - 93,7			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1500	37,7 - 39,7		
	500	30,7 - 34,7		
	2125	32,0 - 36,0		
	2400	10,1 - 16,1		
	2550	below 4,0		
Shut-off	350	0		
Idle stop	350	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,4 - 1,6	mm
LDA	-	mm
Angle of control lever		
α	28,0 - 32,0	angle
A	5,4 - 8,2	mm
β	40,0 - 50,0	angle
B	12,5 - 15,8	mm
Υ	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	28,2 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated.

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	28,2 ± 1,5	-	2,7 ± 0,3	-
1250	18,1 ± 1,5	-	1,5 ± 0,7	-

- MOUNTING AND SETTING M-KSB

1) Setting the M-KSB stop

1. Fix M-KSB unit temporarily to pump casing.
2. Crank drive shaft at least twice in the direction of rotation of the pump.
3. Crank drive shaft slowly, and lock into position at the point where resistance is felt (roller in the bracket is now laying against the disc cam).
4. Rotate KSB lever in direction of adjustment.
5. Hold KSB lever at the position in which the knuckle bolts are just touching the head of the shaft of the roller bracket
   (roller bracket - advance angle "0").
6. Set stop in such a way that the gap dimension between the KSB lever and the stop equals
   0.5 + 2 mm.
7. After setting, tighten the fixing screw with the torque prescribed for M-KSB
   T = 0.6 - 0.9 kpm.

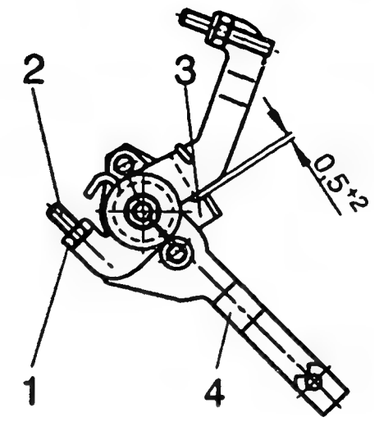


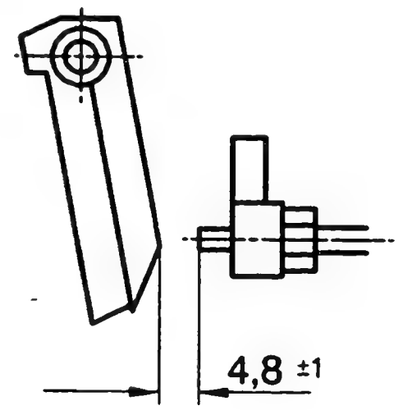
Fig. 19
1 = nut
2 = adjustment screw
3 = stop
4 = KSB lever

Fig. 20

2) Setting the FICD screw
1. Turn KSB lever the other way until it touches the stop.
2. Insert guage block (feeler gauge)

   4.8 ± 1 mm

   between control lever and idle stop screw (distance from idle position 7°).
3. Set FICD screw in such a way that the control lever and the FICD screw are touching.



- SETTING MICROSWITCH

1. Position control lever so that the distance between the lever and the idle stop screw equals

$$8.5 \pm 1 \text{ mm}$$

(control lever angle: 12.5°) and lock lever into place.

2. Set adjustment screw so that the microswitch is switched to ON.

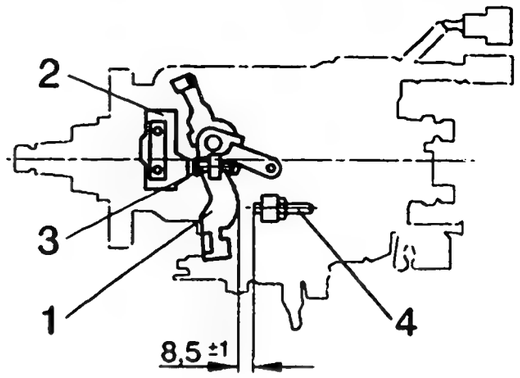


Fig. 21
1 = control lever
2 = microswitch
3 = adjustment screw
4 = idle-stop screw

- SETTING V-FICD

1) Set installation location of V-FICD

1. Stop control lever in the idle position.

2. Set vacuum unit support so that the gap dimension between control lever roller and support bracket equals

$$2 \, {}^{+2}_{+1} \text{ mm.}$$

2) Set V-FICD travel

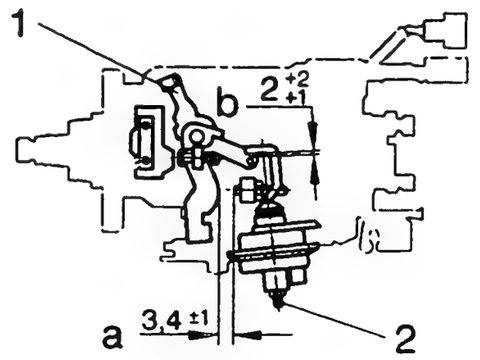
1. Move V-FICD across entire operating travel distance.

2. Set the gap dimension between the control lever and the idle stop screw on the adjustment screw at

$$3.4 \pm 1 \text{ mm.}$$

(Control lever angle: 5°)

Fig. 22
1 = control lever
2 = adjustment screw
a = from idle position
b = gap dimension inside



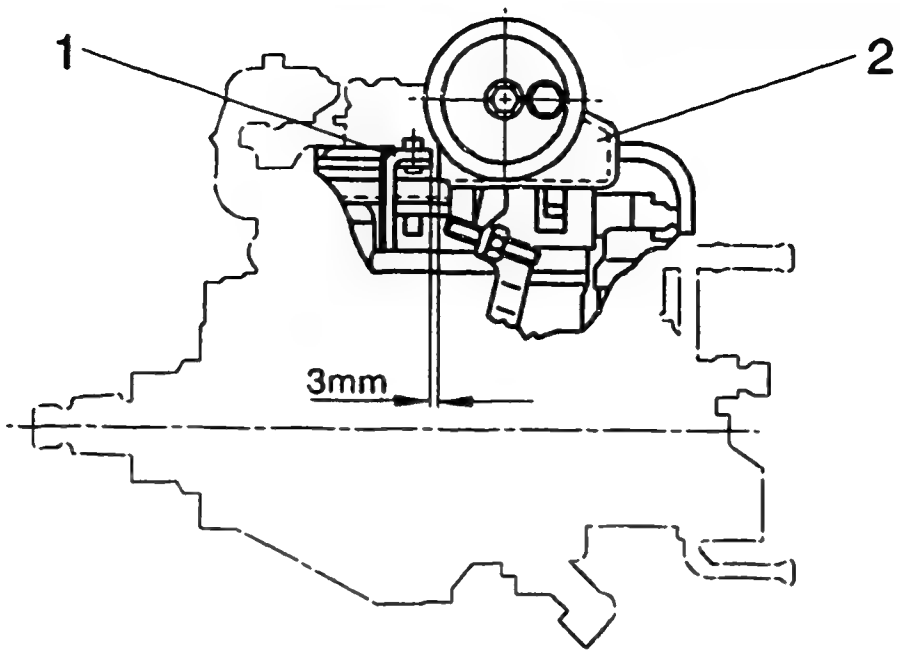


Fig. 23 104748-0164 6/6

1 = control lever
2 = FICD bracket

- SETTING INSTALLATION LOCATION OF FICD

Set bracket in such a way that gap dimension between the control lever and the FICD bracket equals more than 3 mm.

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: R2

BOSCH no. 9 460 610 308
DKKC no. 104748-0183
Date: 15.4.1988 (0)
Company: MAZDA
No: R209 13 800D

Injection pump no. 104648-0193 (NP-VE4/8F2125RNP247)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm

Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1250	3,3 - 3,7 (mm)		
1-2	Feed pump pressure	1250	4,9 - 5,5 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1500	38,2 - 39,2 (cc/1000 strokes)		2,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	6,0 - 10,0 (cc/1000 strokes)		2,0
1-5	Start	100	over 42,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2400	11,1 - 15,1 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	1250	2,7 ± 0,2 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1	1250	1500	2125
	mm	3,2 - 3,8	4,1 - 5,3	7,0 - 8,2
2-2 Feed pump	N = min-1	500	1250	2125
	kg/cm^2	2,7 - 3,3	4,9 - 5,5	7,3 - 7,9
2-3 Overflow rate	N = min-1	1250		
	cc/10s	49,7 - 93,7		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1500	37,7 - 39,7		
	500	30,7 - 34,7		
	2125	32,0 - 36,0		
	2400	10,1 - 16,1		
	2550	below 4,0		
Shut-off	350	0		
Idle stop	350	6,0 - 10,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,4 - 1,6	mm
LDA	-	mm
Angle of control lever		
α	28,0 - 32,0	angle
A	5,4 - 8,2	mm
β	40,0 - 50,0	angle
B	12,5 - 15,8	mm
Y	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1250	/min
Injection quantity:	28,2 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page1 /4).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1250	28,2 ± 1,5	-	2,7 ± 0,3	-
1250	18,1 ± 1,5	-	1,5 ± 0,7	-

1) Setting the M-KSB stop

1. Fix M-KSB unit temporarily to pump casing.
2. Crank drive shaft at least twice in the direction of rotation of the pump.
3. Crank drive shaft slowly, and lock into position at the point where resistance is felt (roller in the bracket is now laying against the disc cam).
4. Rotate KSB lever in direction of adjustment.
5. Hold KSB lever at the position in which the knuckle bolts are just touching the head of the shaft of the roller bracket (roller bracket - advance angle "0").
6. Set stop in such a way that the gap dimension between the KSB lever and the stop equals 0.5 + 2 mm.
7. After setting, tighten the fixing screw with the torque prescribed for M-KSB T = 0.6 - 0.9 kpm.

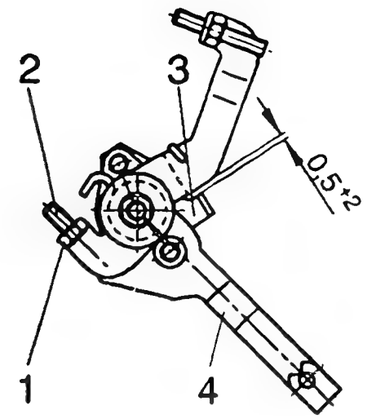
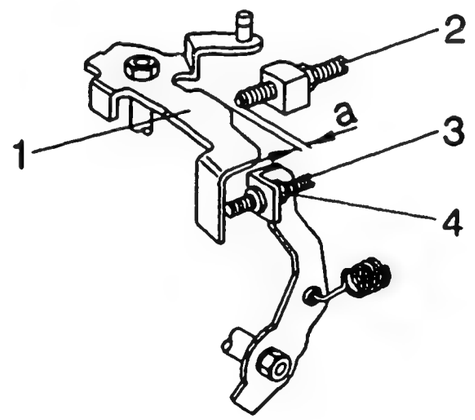


Fig. 24
1 = nut
2 = adjustment screw
3 = stop
4 = KSB lever

Fig. 25
1 = control lever
2 = idle stop screw
3 = FICD screw
4 = nut
a = gauge block

2) Setting the FICD screw 104748-0183 4/4

1. Turn KSB lever the other way until it touches the stop.
2. Insert guage block (feeler gauge) 4.8 ± 1 mm between control lever and idle stop screw (distance from idle position 7°).
3. Set FICD screw in such a way that the control lever and the FICD screw are touching.



Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: RF

BOSCH no. 9 460 610 311
DKKC no. 104748-0344
Date: 15.4.1988 (0)
Company: MAZDA
No: RF79 13 800B

Injection pump no. 104648-0354 (NP-VE4/8F2325RNP580)

Direction of rotation: rear end side clockwise

Prestroke setting: Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1375	4,0 - 4,4 (mm)		
1-2	Feed pump pressure	1375	4,4 - 5,0 (kg/cm^2		
1-3	Full load delivery without charge-air pressure	1375	35,4 - 36,4 (cc/1000 strokes)		2,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	360	9,0 - 11,0 (cc/1000 strokes)		2,0
1-5	Start	100	over 42,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2600	10,8 - 14,8 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	1375	3,4 - 3,8 (mm)		
1-8					

2. Test values

2-1 Timing device	N = min-1		1375	1800	2325	
	mm		3,9-4,5	6,1-7,3	7,2-8,4	
2-2 Feed pump	N = min-1	600	1375	1800	2325	
	kg/cm^2	2,2-2,8	4,4-5,0	5,6-6,2	6,9-7,5	
2-3 Overflow rate	N = min-1		1375			
	cc/10s		46,3-90,3			

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1375	34,9 - 36,9		
	600	29,0 - 33,0		
	2325	30,2 - 34,2		
	2600	9,8 - 15,8		
	2700	below 6,0		
Shut-off	360	0		
Idle stop	360	8,0 - 12,0		

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,4 - 1,6	mm
LDA	-	mm
Angle of control lever		
α	21,0 - 29,0	angle
A	8,8 - 14,1	mm
β	40,0 - 50,0	angle
B	12,7 - 16,0	mm
Y	-	angle
C	-	mm

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	-	mmHg
Pump speed:	1375	/min
Injection quantity:	28,2 ± 1	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1 /4).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1375	28,2 ± 1,5	-	3,6 ± 0,3	-
1375	16,1 ± 1,5	-	2,4 ± 0,7	-

- SETTING SIDE CONNECTING LEVER

1. Clamp control lever in idle position.

2. Set rod (1) in such a way that the dimension for the pin equals 5.8 - 0.2 mm (between the side connecting lever and the angle bracket).
   After this, tighten lock nut.

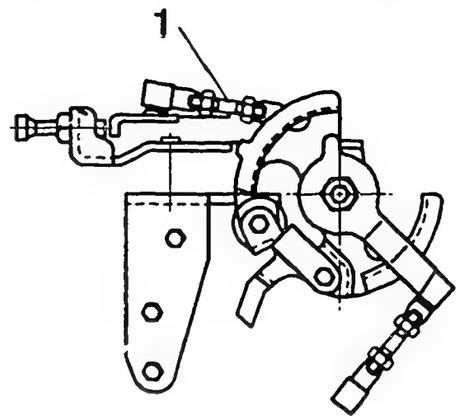


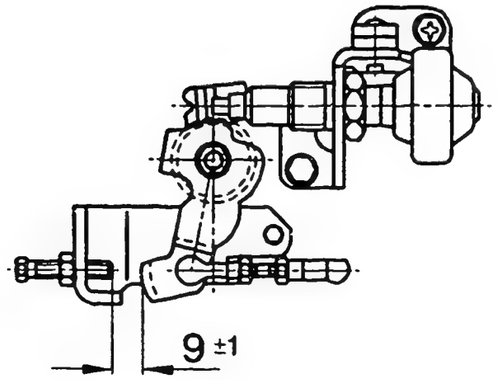
Fig. 26

- SETTING DAMPER

1. Insert gauge block (feeler gauge) 9 ± 1 mm between control lever and idle screw.
   (Control lever angle: 13°)

2. Set damper-adjustment screw in such a way that the damper-adjustment screw and the tappet are touching.
   Tighten the nut securely.

Fig. 27



1. Setting the timing device stroke

   (1) Calculate the timing device stroke (fig. 29) according to the ambient temperature during adjustment.

   (2) Set stroke with the timing device stroke-adjustment screw (1), so that it agrees with the calculation (see below).

2. Setting W - raised idling

   (1) Adjust the adjustment screw (2) until there is a distance of 12.3 ± 0.5 mm between the control lever and the idle stop screw.

3. Setting the control lever angle

   (1) Calculate the control lever angle (ℓ - dimension) as shown in fig. 29, according to the air temperature during adjustment.

   (2) Adjust the control lever angle (ℓ - dimension) with adjustment screw (3).

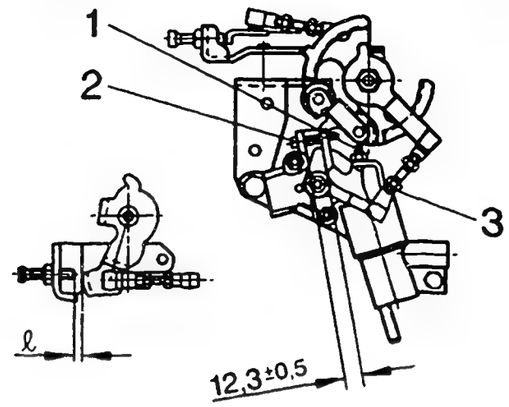


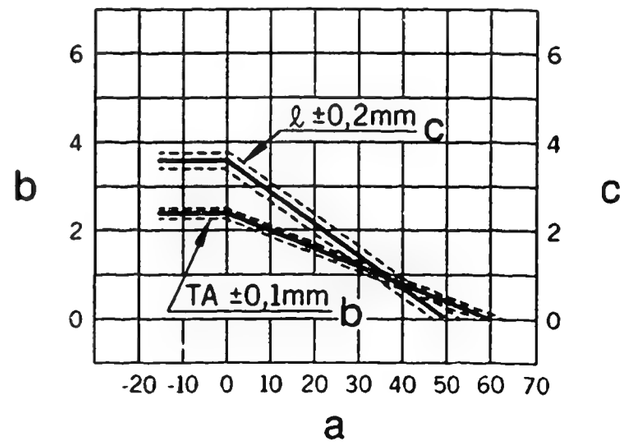
Fig. 28

Fig. 29
a = air temperature (°C)
b = timing device travel (TA) mm
c = gap dimension of control lever/idle-stop screw (ℓ)

Calculation formula (Fig. 29)

Timing device travel: $TA = -0.04\ t + 2.4\ (t \geqq 0°C)$

Control lever angle: $\ell = -0.072\ t + 3.6\ (t \geqq 0°C)$



Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: RFX

BOSCH no. 9 460 610 309
DKKC no. 104749-0344
Date: 15.4.1988 (0)
Company: MAZDA
No: RF71 13 800C

Injection pump no. 104649-0354 (NP-VE4/9F2150RNP556)

Direction of rotation: rear end side clockwise

Prestroke setting: 0,28 - 0,32 mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values

		Speed min-1	Setting values		Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1500	T = 4,4 - 4,8	(mm)	640 - 660	
1-2	Feed pump pressure	1500	5,2 - 5,8	(kg/cm²)	640 - 660	
1-3	Full load delivery without charge-air pressure	1000	49,4 - 50,4	(cc/1000 strokes)	640 - 660	4,0
	Full load delivery with charge-air pressure	1000	44,3 - 45,3	(cc/1000 strokes)	290 - 310	3,5
1-4	Low-idle speed regulation	360	8,1 - 10,1	(cc/1000 strokes)	0	2,0
1-5	Start	100	over 55,0	(cc/1000 strokes)	0	
1-6	Maximum speed regulation	2250	33,2 - 37,2	(cc/1000 strokes)	640 - 660	
1-7	Load-dependent start of delivery	1500	T-0,2 - 0,6	(mm)	640 - 660	
1-8						

2. Test values

2-1 Timing device	N = min-1	1250	1500	2150
	mm	2,7 - 3,9	4,3 - 4,9	7,6 - 8,8
2-2 Feed pump	N = min-1	1250	1500	2150
	kg/cm²	4,5 - 5,1	5,2 - 5,8	6,8 - 7,4
2-3 Overflow rate	N = min-1	1000		
	cc/10s	41,0 - 85,0		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1000	48,9 - 50,9	640 - 660	
	600	33,9 - 38,9	0	
	2150	39,7 - 44,7	640 - 660	
	2250	32,7 - 37,7	640 - 660	
	2550	8,0 - 15,0	640 - 660	
	2700	below 3,0	640 - 660	
	1000	43,8 - 45,8	290 - 310	
Shut-off	360	0	0	
Idle stop	450	below 3,0	0	
	360	7,6 - 10,6	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,6 - 1,8	mm
LDA	3,9 - 4,1	mm
Angle of control lever		
α	21,0 - 29,0	angle
A	8,8 - 14,1	mm
β	39,0 - 45,0	angle
B	12,0 - 13,9	mm
γ	-	angle
C	-	mm

- Note:

When checking the timing device travel and feed pump pressure, apply charge-air pressure of 640 - 660 mmHg to the charge-air pressure chamber.

- SETTING LOAD-DEPENDENT START OF DELIVERY

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	640 - 660	mmHg
Pump speed:	1500	/min
Injection quantity:	38,2 ± 0,5	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/4).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1500	37,2 - 39,2	640 - 660	-	0,1 - 0,7
1500	32,2 - 34,2	640 - 660	-	0,4 - 1,2

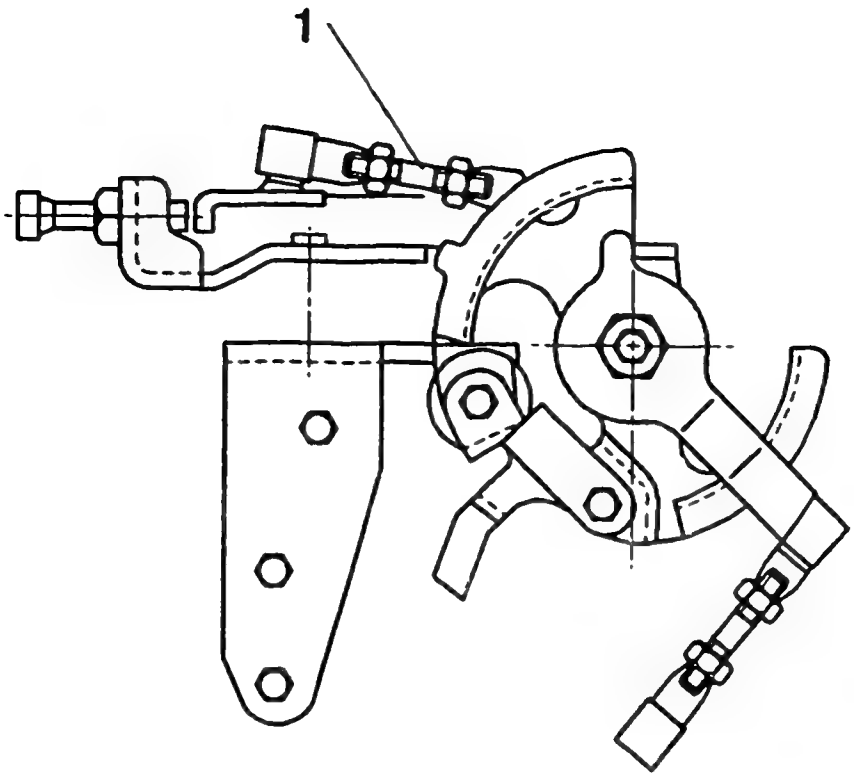


Fig. 30 104749-0344 3/4

- SETTING SIDE CONNECTING LEVER

1. Clamp control lever in idle position.
2. Set rod (1) in such a way that the dimension for the pin equals

   5, 8 - 0, 2 mm

   (between the side connecting lever and the angle bracket).

   After this, tighten lock nut.

• SETTING W-KSB

1. Setting the timing device stroke

   (1) Calculate the timing device stroke (fig. 32) according to the ambient temperature during adjustment.

   (2) Set stroke with the timing device stroke-adjustment screw (1), so that it agrees with the calculation (see below).

2. Setting W - raised idling

   (1) Adjust the adjustment screw (2) until there is a distance of 12.3 ± 0.5 mm between the control lever and the idle stop screw.

3. Setting the control lever angle

   (1) Calculate the control lever angle (ℓ - dimension) as shown in fig. 32, according to the air temperature during adjustment.

   (2) Adjust the control lever angle (ℓ - dimension) with adjustment screw (3).

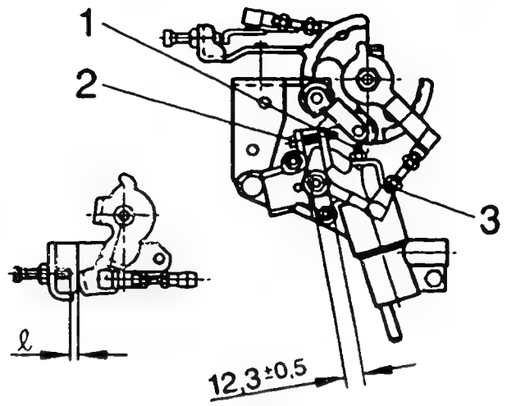


Fig. 31

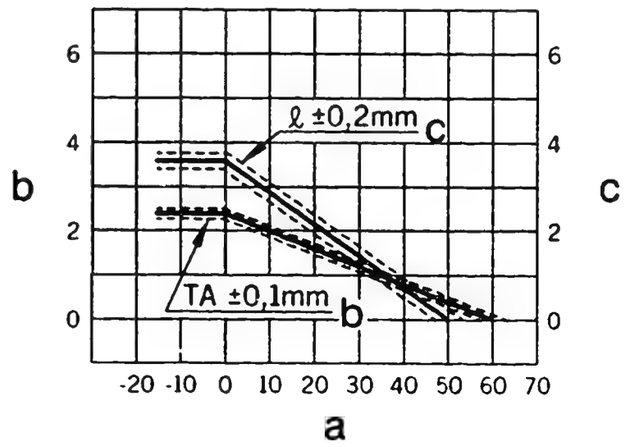
Fig. 32

a = air temperature (°C)
b = timing device travel (TA) mm
c = gap dimension of control lever/idle-stop screw (ℓ)

<u>Calculation formula</u> (Fig. 32)

Timing device travel: $TA = -0.04\ t + 2.4\ (t \geqq 0°C)$

Control lever angle: $\ell = -0.072\ t + 3.6\ (t \geqq 0°C)$



Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: RFX

BOSCH no. 9 460 610 310
DKKC no. 104749-0354
Date: 15.4.1988 (0)
Company: MAZDA
No: RF72 13 800D

Injection pump no. 104649-0364 (NP-VE4/9F2150RNP557)

Direction of rotation: rear end side clockwise

Prestroke setting: 0,28 - 0,32 mm Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values		Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1500	T=4,4 - 4,8	(mm)	640 - 660	
1-2	Feed pump pressure	1500	5,2 - 5,8	(kg/cm^2	640 - 660	
1-3	Full load delivery without charge-air pressure	1000	49,4 - 50,4	(cc/1000 strokes)	640 - 660	4,0
	Full load delivery with charge-air pressure	1000	44,3 - 45,3	(cc/1000 strokes)	290 - 310	3,5
1-4	Low-idle speed regulation	415	11,1 - 13,1	(cc/1000 strokes)	0	2,0
1-5	Start	100	over 55,0	(cc/1000 strokes)	0	
1-6	Maximum speed regulation	2250	33,2 - 37,2	(cc/1000 strokes)	640 - 660	
1-7	Load-dependent start of delivery	1500	T-0,2 - 0,6	(mm)	640 - 660	
1-8						

2. Test values

2-1 Timing device	N = min-1	1250	1500	2150
	mm	2,7 - 3,9	4,3 - 4,9	7,6 - 8,8
2-2 Feed pump	N = min-1	1250	1500	2150
	kg/cm^2	4,5 - 5,1	5,2 - 5,8	6,8 - 7,4
2-3 Overflow rate	N = min-1	1000		
	cc/10s	41,0 - 85,0		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	1000	48,9 - 50,9	640 - 660	
	600	33,9 - 38,9	0	
	2150	39,7 - 44,7	640 - 660	
	2250	32,7 - 37,7	640 - 660	
	2550	8,0 - 15,0	640 - 660	
	2700	below 3,0	640 - 660	
	1000	43,8 - 45,8	290 - 310	
Shut-off	415	0	0	
Idle stop	500	below 3,0	0	
	415	10,6 - 13,6	0	

2-5 Magnet: Cut-in voltage max. 8 V
Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4	mm
KF	5,7 - 5,9	mm
MS	1,6 - 1,8	mm
LDA	3,9 - 4,1	mm
Angle of control lever		
α	21,0 - 29,0	angle
A	8,8 - 14,1	mm
β	38,0 - 44,0	angle
B	12,0 - 13,9	mm
Y	-	angle
C	-	mm

- Note:

When checking the timing device travel and feed pump pressure, apply charge-air pressure of 640 - 660 mmHg to the charge-air pressure chamber.

- SETTING LOAD-DEPENDENT START OF DELIVERY

1. To set

(1) Stop the control lever at the appropriate spot in accordance with the following conditions.

Charge-air pressure:	640 - 660	mmHg
Pump speed:	1500	/min
Injection quantity:	38,2 ± 0,5	cm^3/1000 strokes

(2) When the control lever is in the position specified above (1), adjust the governor sleeve so that the timing device travel is as previously stipulated. (Page 1/4).

2. Checking load-dependent start of delivery

Stop the control lever at the appropriate spot in accordance with the following conditions, and check load-dependent start of delivery.

Position of control lever			Prescribed values	
Pump speed (1/min)	Injection quantity (cm^3/1000 strokes)	Charge-air pressure (mmHg)	Timing device travel (mm)	Reduction of timing device travel (mm)
1500	37,2 - 39,2	640 - 660	-	0,1 - 0,7
1500	32,2 - 34,2	640 - 660	-	0,4 - 1,2

- SETTING SIDE CONNECTING LEVER

1. Clamp control lever in idle position.

2. Set rod (1) in such a way that the dimension for the pin equals 5.8 - 0.2 mm (between the side connecting lever and the angle bracket).
Then tighten lock nut.

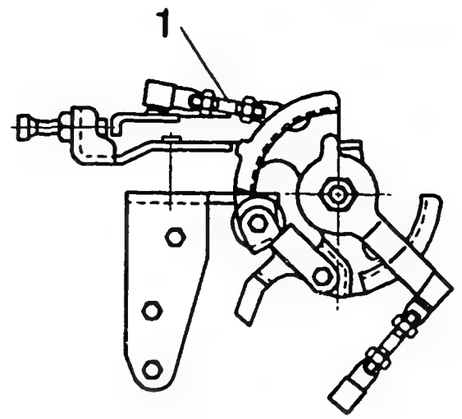


Fig. 33

- SETTING POTENTIOMETER

Setting conditions			Prescribed value	
Control lever position	Pump speed (1/min)	Injection qty. (cm^3/1000 strokes)	Setting value for output voltage (V)	Remarks
Test				Setting point
Idle			1.6 ± 0.03	Setting point
Maximum speed			8.43 ± 0.7	Test point

(Input voltage 10V)

- SETTING W-KSB

1. Setting the timing device stroke

   (1) Calculate the timing device stroke (fig. 35) according to the ambient temperature during adjustment.

   (2) Set stroke with the timing device stroke-adjustment screw (1), so that it agrees with the calculation (see below).

2. Setting W - raised idling

   (1) Adjust the adjustment screw (2) until there is a distance of 12.3 ± 0.5 mm between the control lever and the idle stop screw.

3. Setting the control lever angle

   (1) Calculate the control lever angle (ℓ - dimension) as shown in fig. 35, according to the air temperature during adjustment.

   (2) Adjust the control lever angle (ℓ - dimension) with adjustment screw (3).

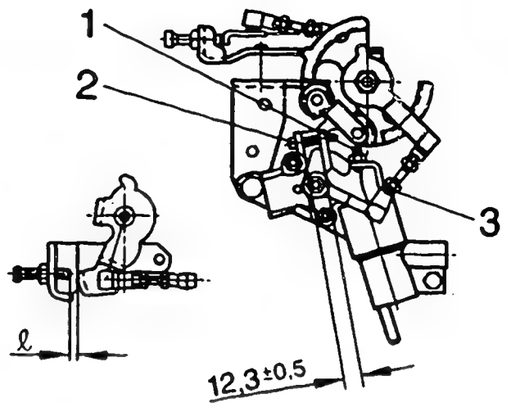


Fig. 34

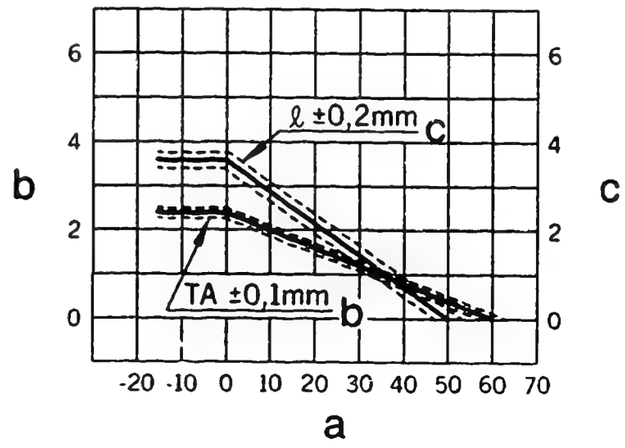
Fig. 35

a = air temperature (°C)
b = timing device travel (TA) mm
c = gap dimension of control lever/idle-stop screw (ℓ)

<u>Calculation formula</u> (Fig. 35)

Timing device travel: $TA = -0.04\ t + 1.6\ (t \geqq 0°C)$

Control lever angle: $\ell = -0.072\ t + 3.6\ (t \geqq 0°C)$



Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: C223

BOSCH no. 9 460 610 274
DKKC no. 104749-1141
Date: 15.4.1988 (0)
Company: ISUZU
No: 894241 6833

Injection pump no. 104649-1151 (NP-VE4/9F2175LNP72)

Direction of rotation: rear end side clockwise

Prestroke setting: - mm

Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	1500	3,8 - 4,2 (mm)		
1-2	Feed pump pressure	1500	5,2 - 5,6 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	1500	40,1 - 41,1 (cc/1000 strokes)		3,0
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	5,5 - 9,5 (cc/1000 strokes)		2,0
1-5	Start	100	over 63,0 (cc/1000 strokes)		
1-6	Maximum speed regulation	2175	10,4 - 16,4 (cc/1000 strokes)		
1-7	Load-dependent start of delivery				
1-8					

2. Test values

2-1 Timing device	N = min-1	1000	1500	2175
	mm	1,4 - 2,6	3,7 - 4,3	6,1 - 7,0
2-2 Feed pump	N = min-1	1000	1500	2175
	kg/cm^2	3,8 - 4,4	5,2 - 5,6	6,6 - 7,2
2-3 Overflow rate	N = min-1	1000		
	cc/10s	52,0 - 95,0		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	2550	below 6,0		
	2440	10,4 - 16,4		
	2175	34,7 - 38,7		
	1500	39,6 - 41,6		
	600	30,0 - 34,0		
Shut-off	350	0		
Idle stop	350	5,5 - 9,5		
	450	below 3,0		

2-5 Magnet	Cut-in voltage max. 8 V Test voltage 12 - 14 V

3. Dimensions

K	3,2 - 3,4 mm
KF	5,7 - 5,9 mm
MS	1,7 - 1,9 mm
LDA	- mm
Angle of control lever	
α	21,0 - 29,0 angle
A	2,8 - 8,0 mm
β	36,5 - 46,5 angle
B	10,5 - 14,5 mm
γ	- angle
C	- mm

Test oil:
ISO 4113 od
SAE J967d

ZEXEL - Test values
Distributor pumps
Engine: LD28

BOSCH no. 9 460 610 292
DKKC no. 104769-2026
Date: 15.4.1988 (0)
Company: NISSAN
No: 16700 V5710

Injection pump no. 104669-2026 (NP-VE6/9F2500RNP21)
Direction of rotation: rear end side clockwise
Prestroke setting: - mm
Test-nozzle holder combination: 1 688 901 000 Test pressure line: 1 680 750 017

1. Setting values		Speed min-1	Setting values	Charge - air pressure - bar (mmHg)	Difference (cc)
1-1	Timing device travel	900	T=2,0 - 2,6 (mm)		
1-2	Feed pump pressure	900	3,5 - 4,1 (kg/cm^2)		
1-3	Full load delivery without charge-air pressure	900	29,0 - 30,0 (cc/1000 strokes)		2,5
	Full load delivery with charge-air pressure		(cc/1000 strokes)		
1-4	Low-idle speed regulation	350	6,3 - 9,3 (cc/1000 strokes)		
1-5	Start	100	40,8 - 48,8 (cc/1000 strokes)		
1-6	Maximum speed regulation	2600	15,5 - 21,5 (cc/1000 strokes)		
1-7	Load-dependent start of delivery	900	T-0,2 - 0,8 (mm)		
1-8			(0,8 - 10,0 cc/1000 strokes)		

2. Test values

2-1 Timing device	N = min-1	900	1200	2300
	mm	1,9 - 2,7	3,5 - 4,7	8,1 - 9,0
2-2 Feed pump	N = min-1	900	1800	2500
	kg/cm^2	3,4 - 4,2	5,5 - 6,3	7,2 - 8,0
2-3 Overflow rate	N = min-1	900		
	cc/10s	43,0 - 87,0		

2-4 Delivery rates

Control lever position	Speed min-1	Delivery rate (cc/1000 strokes)	Charge-air pressure bar (mmHg)	Difference (cc)
End stop	900	28,5 - 30,5		
	600	27,0 - 31,0		
	2300	28,8 - 32,8		
	2600	15,0 - 22,0		
	2800	below 5,0		
Shut-off	350	0		
Idle stop	350	5,8 - 9,8		2,0
	500	below 4,0		
Part load	900	2,1 - 12,1		

2-5 Magnet: Cut-in voltage max. 12 V
Test voltage V

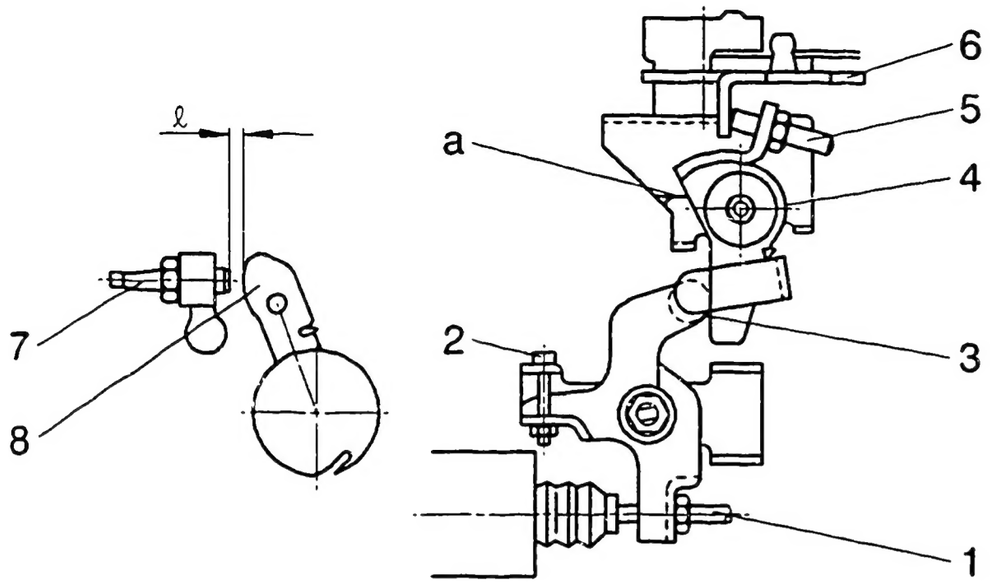
3. Dimensions		
K	3,2 - 3,4	mm
KF	6,54 - 6,74	mm
MS	1,7 - 1,9	mm
LDA	-	mm
Angle of control lever		
α	21,0 - 29,0	angle
A	2,5 - 8,0	mm
β	39,0 - 49,0	angle
B	11,0 - 16,0	mm
Y	10,5 - 11,5	angle
C	6,7 - 7,3	mm

Setting the stop lever starting delivery

Set the above so that the starting injection delivery lies within the specified range (Page 1/4).

Tighten the adjustment screw for the starting delivery of the stop lever.

Setting the W-CSD (KSB) test point				
	Water temp. °C	U/min	mm	Base
Timing device stroke	50		0	
	+0.5° 20 -		0.55 ± 0.2	Base
	-10		1.65	
	Water temp. °C	U/min	Degree	Base
F.I.C.D. lever angle	50		0	
	+0.5° 20 -		+ 0.5° 2-	Base
	-10		(6)	



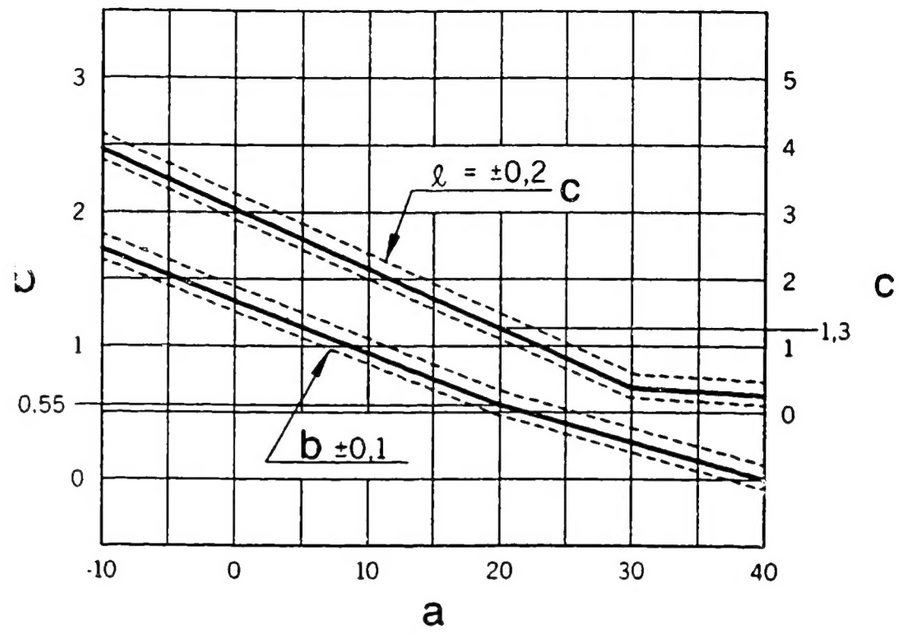


Fig. 36

a = Testing of standard line is not necessary

Fig. 37

Fig. 38

a = temperature (°C)
b = timing device travel (mm)
c = measurement: ℓ mm (tolerance between control lever and idle stop screw)

- SETTING THE W-CSD (KSB)

1. Setting the timing device travel (see fig. 38)

   Set travel of timing device with the screw (1) in such a way that the timing device lift conforms to the values contained in the diagram (fig. 38).

2. Setting the intermediate lever position (see figs. 36 and 37)

Insert the thickness gauge $\ell = 1.3 \pm {}^{0.05}$ mm between the idle adjustment screw (7) and the control lever (6). When the upper edge of the intermediate lever roller (4) is in the position where the upper edge of the angle (8) is located, temporarily tighten the screw (5) so that it touches the control lever (6). Then turn the screw clockwise a half or a full rotation. Turn back to its previous position, and then tighten. (During this process, the intermediate lever moves clockwise across the horizontal position by 1° to 3°)

3. Setting the W-CSD (KSB) lever (see figs. 36 and 37)

Insert the thickness gauge $\ell = \pm {}^{0.05}$ mm between the idle adjustment screw (7) and the control lever (6), as in the diagram (fig. 38), and tighten the screw (2) in the spot where the roller of the W-CSD lever (3) touches the intermediate lever (4). (During insertion, the temperature of the wax should remain below 30°C)

Note: When inserting the thickness gauge between levers (3) and (4), using the screw (2), leave a big enough gap so that no pressure is exerted on the lever.

Calculation formula (Fig. 37)

Timing device travel:

$-10 \leqq t \leqq 20 \quad TA = -0.0367\ t + 1.284$
$20 \leqq t \leqq 40 \quad TA = -0.0275\ t + 1.1$

Tolerance between control lever and idle stop screw:

$-10 \leqq t \leqq 20 \quad \ell = -0.0628\ t + 2.1555$
$20 \leqq t \leqq 30 \quad \ell = -0.0507\ t + 1.9142$
$30 \leqq t \leqq 50 \quad \ell = -0.0196\ t + 0.9809$